DOCUMENT RESUME

ED 440 066 SP 039 106

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TITLE	Teaching. Educational Practices Series--1.
INSTITUTION	International Bureau of Education, Geneva (Switzerland).; International Academy of Education, Brussels (Belgium).
PUB DATE	2000-00-00
NOTE	37p.
AVAILABLE FROM	International Bureau of Education, P.O. Box 199, 1211 Geneva, 20, Switzerland. For full text: http://www.ibe.unesco.org.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Academic Achievement; Classroom Environment; Cooperative Learning; Curriculum Development; Discussion (Teaching Technique); *Educational Quality; Elementary Secondary Education; Feedback; Foreign Countries; Learning Strategies; Student Evaluation; *Teacher Effectiveness; Teacher Expectations of Students; Teaching Methods
IDENTIFIERS	Curriculum Alignment; Opportunity to Learn; Scaffolding

ABSTRACT

This booklet presents a synthesis of the principles of effective teaching that have emerged from research in classrooms. It addresses generic aspects of curriculum, instruction, and assessment as well as classroom organization and management practices that support effective instruction. It focuses on learning outcomes, but recognizes the need for a supportive climate and positive student attitudes toward schooling, teachers, and classmates. Much of the research support for these principles comes from studies of relationships between classroom processes (measured through observation systems) and student outcomes (particularly gains in standardized achievement scores). The booklet contains 12 chapters as follows: (1) "A Supportive Classroom Climate"; (2) "Opportunity to Learn"; (3) "Curricular Alignment"; (4) "Establishing Learning Orientations"; (5) "Coherent Content"; (6) "Thoughtful Discourse"; (7) "Practice and Application Activities"; (8) "Scaffolding Students' Task Engagement"; (9) "Strategy Teaching"; (10) "Cooperative Learning"; (11) "Goal-Oriented Assessment"; and (12) "Achievement Expectations." (Contains 31 references.) (SM)

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Teaching

By Jere Brophy

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Series preface

This booklet on the generic aspects of effective teaching has been prepared for inclusion in the Educational Practices Series developed by the International Academy of Education and distributed by the International Bureau of Education and the Academy. One mission of the International Academy of Education is to foster scholarly excellence in all fields of education. As part of this mission, the Academy provides timely syntheses of research on educational topics of international importance. This booklet is the first in a series on educational practices that generally improve learning. It focuses on the most central act of education–teaching.

The author is Jere Brophy, who is University Distinguished Professor of Teacher Education at Michigan State University and a Fellow of the International Academy of Education. He is well known both for his personal contributions to educational research and for his policy-oriented syntheses of work on various aspects of classroom teaching. He was one of the developers of process/product research, which examines relationships between teaching practices and student outcomes. Also, he has contributed to research and scholarship concerning teachers' attitudes, beliefs and expectations, including self-fulfilling prophecy effects; the interpersonal dynamics of teacher/student interaction; classroom management; student motivation; the analysis of instructional materials and learning activities; and the teaching of school subjects for understanding, appreciation and life application.

The Academy is grateful to Professor Brophy for planning, drafting and revising this booklet. Professor Brophy wishes to thank Lorin Anderson, Erik De Corte, Barry Fraser and Herbert Walberg for their comments on previous drafts of the booklet, and June Benson for her assistance with manuscript preparation.

The officers of the International Academy of Education are aware that this booklet is based on research carried out primarily in economically advanced countries. The booklet, however, focuses on aspects of teaching that appear to be universal in much formal schooling and thus seem likely to be generally applicable throughout the world. Even so, the principles need to be assessed with reference to local conditions.

and adapted accordingly. In any educational setting, guidelines for practice require sensitive and sensible application and continuing evaluation of their effectiveness.

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This publication has been produced by the International Academy of Education (IAE), Palais des Académies, 1, rue Ducale, 1000 Brussels, Belgium, and the International Bureau of Education (IBE), P.O. Box 199, 1211 Geneva 20, Switzerland.

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Printed in Switzerland by PCL, Lausanne.

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Introduction

This booklet is a synthesis of principles of effective teaching that have emerged from research in classrooms. It addresses generic aspects of curriculum, instruction and assessment, as well as classroom organization and management practices that support effective instruction. It focuses on learning outcomes but with recognition of the need for a supportive classroom climate and positive student attitudes towards schooling, teachers and classmates.

Much of the research support for these principles comes from studies of relationships between classroom processes (measured through observation systems) and student outcomes (most notably, gains in standardized achievement tests). However, some principles are rooted in the logic of instructional design (e.g. the need for alignment among a curriculum's goals, content, instructional methods and assessment measures). In addition, attention was paid to emergent theories of teaching and learning (e.g. socio-cultural, social constructivist) and to the standards statements circulated by organizations representing the major school subjects. Priority was given to principles that have been shown to be applicable under ordinary classroom conditions and associated with progress towards desired student outcomes.

The principles rest on a few fundamental assumptions about optimizing curriculum and instruction. First, school curricula subsume different types of learning that call for different types of teaching, and so no single teaching method (e.g. direct instruction, social construction of meaning) can be the method of choice for all occasions. An optimal programme will feature a mixture of instructional methods and learning activities.

Second, within any school subject or learning domain, students' instructional needs change as their expertise develops. Consequently, what constitutes an optimal mixture of instructional methods and learning activities will evolve as school years, instructional units and even individual lessons progress.

Third, students should learn at high levels of mastery yet progress through the curriculum steadily. This implies that, at any given time, curriculum content and learning activities need to be difficult enough to challenge students and extend their

learning, but not so difficult as to leave many students confused or frustrated. Instruction should focus on the zone of proximal development, which is the range of knowledge and skills that students are not yet ready to acquire on their own but can acquire with help from their teachers.

1. A supportive classroom climate

Students learn best within cohesive and caring learning communities.

Research findings

Productive contexts for learning feature an ethic of caring that pervades teacher/student and student/student interactions and transcends gender, race, ethnicity, culture, socio-economic status, handicapping conditions and all other individual differences. Students are expected to manage instructional materials responsibly, participate thoughtfully in learning activities, and support the personal, social and academic well-being of all members of the classroom community.

In the classroom

To create a climate for moulding their students into a cohesive and supportive learning community, teachers need to display personal attributes that will make them effective as models and socializers: a cheerful disposition, friendliness, emotional maturity, sincerity, and caring about students as individuals as well as learners. The teacher displays concern and affection for students, is attentive to their needs and emotions, and socializes them to display these same characteristics in their interactions with one another.

In creating classroom displays and in developing content during lessons, the teacher connects with and builds on the students' prior knowledge and experiences, including their home cultures. Extending the learning community from the school to the home, the teacher establishes and maintains collaborative relationships with parents and encourages their active involvement in their children's learning.

The teacher promotes a learning orientation by introducing activities with emphasis on what students will learn from them, treating mistakes as natural parts of the learning process, and

encouraging students to work collaboratively and help one another. Students are taught to ask questions without embarrassment, to contribute to lessons without fear of their ideas being ridiculed, and to collaborate in pairs or small groups on many of their learning activities.

References: Good & Brophy (2000); Sergiovanni (1994).

2. Opportunity to learn

Students learn more when most of the available time is allocated to curriculum-related activities and the classroom management system emphasizes maintaining their engagement in those activities.

Research findings

A major determinant of learning in any academic domain is the degree of exposure to the domain at school. The lengths of the school day and the school year create upper limits on students' opportunities to learn. Within these limits, the learning opportunities actually experienced by students depend on how much of the available time they spend participating in lessons and learning activities. Effective teachers allocate most of the available time to activities designed to accomplish instructional goals.

Research indicates that teachers who approach management as a process of establishing an effective learning environment tend to be more successful than teachers who emphasize their roles as disciplinarians. Effective teachers do not need to spend much time responding to behaviour problems because they use management techniques that elicit students' co-operation and sustain their engagement in activities. Working within the positive classroom climate implied by the principle of a learning community, the teacher articulates clear expectations concerning classroom behaviour in general and participation in lessons and learning activities in particular. teaches procedures that foster productive engagement during activities and smooth transitions between them. and follows through with any needed cues or reminders.

In the classroom

There are more things worth learning than there is time available to teach them. and so it is essential that limited classroom time be used efficiently. Effective teachers allocate most of this

time to lessons and learning activities rather than to non-academic pastimes that serve little or no curricular purpose. Their students spend many more hours each year on curriculum-related activities than do students of teachers who are less focused on instructional goals.

Effective teachers convey a sense of the purposefulness of schooling and the importance of getting the most out of the available time. They begin and end lessons on time, keep transitions short, and teach their students how to get started quickly and maintain focus when working on assignments. Good planning and preparation enable them to proceed through lessons smoothly without having to stop to consult a manual or locate an item needed for display or demonstration. Their activities and assignments feature stimulating variety and optimal challenge, which help students to sustain their task engagement and minimize disruptions due to boredom or distraction.

Successful teachers are clear and consistent in articulating their expectations. At the beginning of the year they model or provide direct instruction in desired procedures if necessary, and subsequently they cue or remind their students when these procedures are needed. They monitor the classroom continually, which enables them to respond to emerging problems before they become disruptive. When possible, they intervene in ways that do not disrupt lesson momentum or distract students who are working on assignments. They teach students strategies and procedures for carrying out recurring activities such as participating in whole-class lessons, engaging in productive discourse with classmates, making smooth transitions between activities, collaborating in pairs or small groups, storing and handling equipment and personal belongings, managing learning and completing assignments on time, and knowing when and how to get help. The teachers' emphasis is not on imposing situational control but on building students' capacity for managing their own learning, so that expectations are adjusted and cues, reminders and other managerial moves are faded out as the school year progresses.

These teachers do not merely maximize 'time on task', but spend a great deal of time actively instructing by elaborating content for students and helping them to interpret and respond to it. Their classrooms feature more time spent in interactive discourse and less time spent in solitary seatwork. Most of their instruction occurs during interactive discourse with students rather than during extended lecture presentations.

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Note: The principle of maximizing opportunity to learn is not meant to imply maximizing the scope of the curriculum (i.e. emphasizing broad coverage at the expense of depth of development of powerful ideas). The breadth/depth dilemma must be addressed in curriculum planning. The point of the opportunity-to-learn principle is that, however the breadth/depth dilemma is addressed and whatever the resultant curriculum may be, students will make the most progress towards intended outcomes if most of the available classroom time is allocated to curriculum-related activities.

Note: Opportunity to learn is sometimes defined as the degree of overlap between what is taught and what is tested. This definition can be useful if both the curriculum content and the test content reflect the major goals of the instructional programme. Where this is not the case, achieving an optimal alignment may require making changes in the curriculum content or in the test content, or in both (see next principle).

References: Brophy (1983); Denham & Lieberman (1980); Doyle (1986).

3. Curricular alignment

All components of the curriculum are aligned to create a cohesive programme for accomplishing instructional purposes and goals.

Research findings

Research indicates that educational policy-makers, textbook publishers and teachers often become so focused on content coverage or learning activities that they lose sight of the larger purposes and goals that are supposed to guide curriculum planning. Teachers typically plan by concentrating on the content they intend to cover and the steps involved in the activities their students will carry out, without giving much thought to the goals or intended outcomes of the instruction. Textbook publishers, in response to pressure from special interest groups, tend to keep expanding their content coverage. As a result, too many topics are covered in not enough depth; content exposition often lacks coherence and is cluttered with insertions; skills are taught separately from knowledge content rather than integrated with it; and in general, neither the students' texts nor the questions and activities suggested in the teachers' manuals are structured around powerful ideas connected to important goals.

Students taught using such textbooks may be asked to memorize parades of disconnected facts or to practise disconnected subskills in isolation instead of learning coherent networks of connected content structured around powerful ideas. These problems are often exacerbated by externally imposed assessment programmes that emphasize recognition of isolated bits of knowledge or performance of isolated subskills. Such problems can be minimized through goal-oriented curriculum development, in which curricular planning is guided by the overall purposes and goals of the instruction, not by miscellaneous content coverage pressures or test items.

In the classroom

A curriculum is not an end in itself; it is a means of helping students to learn what is considered essential for preparing them to fulfil adult roles in society and realize their potential as individuals. Its goals are learner outcomes–the knowledge, skills, attitudes, values and dispositions to action that society wishes to develop in its citizens. The goals are the reason for the existence of the curriculum, so that beliefs about what is needed to accomplish them should guide each step in curriculum planning and implementation. Goals are most likely to be attained if all of the curriculum's components (content clusters, instructional methods, learning activities and assessment tools) are selected because they are believed to be needed as means of helping students to accomplish the overall purposes and goals.

This involves planning curriculum and instruction to develop capabilities that students can use in their lives inside and outside school, both now and in the future. In this regard, it is important to emphasize goals of understanding, appreciation and life application. Understanding means that students learn both the individual elements in a network of related content and the connections among them, so that they can explain the content in their own words and connect it to their prior knowledge. Appreciation means that students value what they are learning because they understand that there are good reasons for learning it. Life application means that students retain their learning in a form that makes it usable when needed in other contexts.

Content developed with these goals in mind is likely to be retained as meaningful learning that is internally coherent, well connected with other meaningful learning and accessible for application. This is most likely to occur when the content itself is structured around powerful ideas and the development of this content through classroom lessons and learning activities focuses on these ideas and their connections.

References: Beck & McKeown (1988); Clark & Peterson (1986); Wang, Haertel & Walberg (1993).

4. Establishing learning orientations

Teachers can prepare students for learning by providing an initial structure to clarify intended outcomes and cue desired learning strategies.

Research findings

Research indicates the value of establishing a learning orientation by beginning lessons and activities with advance organizers or previews. These introductions facilitate students' learning by communicating the nature and purpose of the activity, connecting it to prior knowledge and cueing the kinds of student responses that the activity requires. This helps students to remain goal-oriented and strategic as they process information and respond to the questions or tasks embodied in the activity. Good lesson orientations also stimulate students' motivation to learn by communicating enthusiasm for the learning or helping students to appreciate its value or application potential.

In the classroom

Advance organizers orient students to what they will be learning before the instruction begins. They characterize the general nature of the activity and give students a structure within which to understand and connect the specifics that will be presented by the teacher or text. Such knowledge of the nature of the activity and the structure of its content helps students to focus on the main ideas and order their thoughts effectively. Therefore, before beginning any lesson or activity, the teacher should ensure that students know what they will be learning and why it is important for them to learn it.

Other ways to help students learn with a sense of purpose and direction include calling attention to the activity's goals, overviewing main ideas or major steps to be elaborated, pre-

tests that sensitize students to main points to learn, and pre-questions that stimulate their thinking about the topic.

References: Ausubel (1968); Brophy (1998); Meichenbaum & Biemiller (1998).

5. Coherent content

To facilitate meaningful learning and retention, content is explained clearly and developed with emphasis on its structure and connections.

Research findings

Research indicates that networks of connected knowledge structured around powerful ideas can be learned with understanding and retained in forms that make them accessible for application. In contrast, disconnected bits of information are likely to be learned only through low-level processes such as rote memorizing, and most of these bits either are soon forgotten or are retained in ways that limit their accessibility. Similarly, skills are likely to be learned and used effectively if taught as strategies adapted to particular purposes and situations, with attention to when and how to apply them; but students may not be able to integrate and use skills that are learned only by rote and practised only in isolation from the rest of the curriculum.

In the classroom

Whether in textbooks or in teacher-led instruction, information is easier to learn to the extent that it is coherent–the sequence of ideas or events makes sense and the relationships among them are apparent. Content is most likely to be organized coherently when it is selected in a principled way, guided by ideas about what students should learn from studying the topic.

When making presentations, providing explanations or giving demonstrations, effective teachers project enthusiasm for the content and organize and sequence it so as to maximize its clarity and coherence. The teacher presents new information with reference to what students already know about the topic; proceeds in small steps sequenced in ways that are easy to follow; uses pacing, gestures and other oral communication skills

to support comprehension: avoids vague or ambiguous language and digressions that disrupt continuity; elicits students' responses regularly to stimulate active learning and ensure that each step is mastered before moving to the next; finishes with a review of main points, stressing general integrative concepts; and follows up with questions or assignments that require students to encode the material in their own words and apply or extend it to new contexts. If necessary, the teacher also helps students to follow the structure and flow of the content by using outlines or graphic organizers that depict relationships, study guides that call attention to key ideas, or task organizers that help students keep track of the steps involved and the strategies they use to complete these steps.

In combination, the principles calling for curricular alignment and for coherent content imply that, to enable students to construct meaningful knowledge that they can access and use in their lives outside school, teachers need to: (i) retreat from breadth of coverage in order to allow time to develop the most important content in greater depth; (ii) represent this important content as networks of connected information structured around powerful ideas; (iii) develop the content with a focus on explaining these important ideas and the connections among them; and (iv) follow up with authentic learning activities and assessment measures that provide students with opportunities to develop and display learning that reflects the intended outcomes of the instruction.

References: Beck & McKeown (1988); Good & Brophy (2000); Rosenshine (1968).

6. Thoughtful discourse

Questions are planned to engage students in sustained discourse structured around powerful ideas.

Research findings

Besides presenting information and modelling application of skills, effective teachers structure a great deal of content-based discourse. They use questions to stimulate students to process and reflect on content, recognize relationships among and implications of its key ideas, think critically about it, and use it in problem solving, decision making or other higher-order applications. The discourse is not limited to rapidly paced recitation that elicits short answers to miscellaneous questions. Instead, it features sustained and thoughtful development of key ideas. Through participation in such discourse, students construct and communicate content-related understandings. In the process, they abandon naïve ideas or misconceptions and adopt the more sophisticated and valid ideas embedded in the instructional goals.

In the classroom

In the early stages of units when new content is introduced and developed, more time is spent in interactive lessons featuring teacher/student discourse than in independent work on assignments. The teacher plans sequences of questions designed to develop the content systematically and help students to construct understandings of it by relating it to their prior knowledge and collaborating in dialogue about it.

The forms and cognitive levels of these questions need to be suited to the instructional goals. Some primarily closed-end and factual questions might be appropriate when teachers are assessing prior knowledge or reviewing new learning, but accomplishing the most significant instructional goals requires open-ended questions that call for students to apply, analyse, synthesize or evaluate what they are learning. Some questions

will admit of a range of possible correct answers, and some will invite discussion or debate (e.g. concerning the relative merits of alternative suggestions for solving problems).

Because questions are intended to engage students in cognitive processing and construction of knowledge, they should ordinarily be addressed to the class as a whole. This encourages all students, not just the one eventually called on, to listen carefully and respond thoughtfully to each question. After posing a question, the teacher needs to pause to allow students enough time to process it and at least begin to formulate responses, especially if the question is complicated or requires students to engage in higher-order thinking.

Thoughtful discourse features sustained examination of a small number of related topics, in which students are invited to develop explanations, make predictions, debate alternative approaches to problems, or otherwise consider the content's implications or applications. The teacher presses students to clarify or justify their assertions, rather than accepting them indiscriminately. In addition to providing feedback, the teacher encourages students to explain or elaborate on their answers or to comment on classmates' answers. Frequently, discourse that begins in a question-and-answer format evolves into an exchange of views in which students respond to one another as well as to the teacher and respond to statements as well as to questions.

References: Good & Brophy (2000); Newmann (1990); Rowe (1986).

7. Practice and application activities

Students need sufficient opportunities to practise and apply what they are learning, and to receive improvement-oriented feedback.

Research findings

There are three main ways in which teachers help their students to learn. First, they present information, explain concepts and model skills. Second, they ask questions and lead their students in discussion and other forms of discourse surrounding the content. Third, they engage students in activities or assignments that provide them with opportunities to practise or apply what they are learning. Research indicates that skills practised to a peak of smoothness and automaticity tend to be retained indefinitely, whereas skills that are mastered only partially tend to deteriorate. Most skills included in school curricula are learned best when practice is distributed across time and embedded within a variety of tasks. Thus, it is important to follow up thorough initial teaching with occasional review activities and with opportunities for students to use what they are learning in a variety of application contexts.

In the classroom

Practice is one of the most important yet least appreciated aspects of learning in classrooms. Little or no practice may be needed for simple behaviours such as pronouncing words, but practice becomes more important as learning becomes complex. Successful practice involves polishing skills that are already established at rudimentary levels in order to make them smoother, more efficient and more automatic, and not trying to establish such skills through trial and error.

Fill-in-the-blank worksheets, pages of mathematical computation problems and related tasks that engage students in memorizing facts or practising subskills in isolation from the

rest of the curriculum should be minimized. Instead, most practice should be embedded within application contexts that feature conceptual understanding of knowledge and self-regulated application of skills. Thus, most practice of reading skills is embedded within lessons involving reading and interpreting extended text, most practice of writing skills is embedded within activities calling for authentic writing, and most practice of mathematics skills is embedded within problem-solving applications.

Opportunity to learn in school can be extended through homework assignments that are realistic in length and difficulty given the students' abilities to work independently. To ensure that students know what to do, the teacher can get them started on assignments in class, and then have them finish the work at home. An accountability system should be in place to ensure that students complete their homework assignments, and the work should be reviewed in class the next day.

To be useful, practice must involve opportunities not only to apply skills but also to receive timely feedback. Feedback should be informative rather than evaluative, helping students to assess their progress with respect to major goals and to understand and correct errors or misconceptions. At times when teachers are unable to circulate to monitor progress and provide feedback, they should arrange for students working on assignments to get feedback by consulting posted study guides or answer sheets or by asking peers designated to act as tutors or resource persons.

References: Brophy & Alleman (1991); Cooper (1994); Dempster (1991); Knapp (1995).

8. Scaffolding students' task engagement

The teacher provides whatever assistance students need to enable them to engage in learning activities productively.

Research findings

Research on learning tasks suggests that activities and assignments should be sufficiently varied and interesting to motivate student engagement, sufficiently new or challenging to constitute meaningful learning experiences rather than needless repetition, and yet sufficiently easy to allow students to achieve high rates of success if they invest reasonable time and effort. The effectiveness of assignments is enhanced when teachers first explain the work and go over practice examples with students before releasing them to work independently, and then circulate to monitor progress and provide help when needed. The principle of teaching within the students' zones of proximal development implies that students will need explanation, modelling, coaching and other forms of assistance from their teachers, but also that this teacher structuring and scaffolding will be faded as the students' expertise develops. Eventually, students should become able to use what they are learning autonomously and to regulate their own productive task engagement.

In the classroom

Besides being well chosen, activities need to be effectively presented, monitored and followed up if they are to have their full impact. This means preparing students for an activity in advance, providing guidance and feedback during the activity, and leading the class in post-activity reflection afterwards. In introducing activities, teachers should stress their purposes in ways that will help students to engage in them with clear ideas about the goals to be accomplished. Then they might call stu-

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dents' attention to relevant background knowledge, model strategies for responding to the task or scaffold by providing information about task requirements. If reading is involved, for example, teachers might summarize the main ideas, remind students about strategies for developing and monitoring their comprehension as they read (paraphrasing, summarizing, taking notes, asking themselves questions to check understanding), distribute study guides that call attention to key ideas and structural elements, or provide task organizers that help students to keep track of the steps involved and the strategies that they are using.

Once students begin working on activities or assignments, teachers should circulate to monitor their progress and provide assistance if necessary. Assuming that students have a general understanding of what to do and how to do it, these interventions can be kept brief and confined to minimal and indirect forms of help. If teacher assistance is too direct or extensive, teachers will end up carrying out tasks for students instead of helping them learn to carry out the tasks themselves.

Teachers also need to assess performance for completion and accuracy. When performance is poor, they will need to provide re-teaching and follow-up assignments designed to ensure that content is understood and skills are mastered.

Most assignments will not have their full effects unless they are followed by reflection or debriefing activities in which the teacher reviews the task with the students, provides general feedback about performance, and reinforces main ideas as they relate to overall goals. Reflection activities should also include opportunities for students to ask follow-up questions, share task-related observations or experiences, compare opinions, or in other ways deepen their appreciation of what they have learned and how it relates to their lives outside school.

References: Brophy & Alleman (1991); Rosenshine & Meister (1992); Shuell (1996); Tharp & Gallimore (1988).

9. Strategy teaching

The teacher models and instructs students in learning and self-regulation strategies.

Research findings

General learning and study skills as well as domain-specific skills (such as constructing meaning from text, solving mathematical problems or reasoning scientifically) are most likely to be learned thoroughly and become accessible for application if they are taught as strategies to be brought to bear purposefully and implemented with metacognitive awareness and self-regulation. This requires comprehensive instruction that includes attention to propositional knowledge (what to do), procedural knowledge (how to do it) and conditional knowledge (when and why to do it). Strategy teaching is especially important for less able students who otherwise might not come to understand the value of consciously monitoring, self-regulating and reflecting upon their learning processes.

In the classroom

Many students do not develop effective learning and problem-solving strategies on their own but can acquire them through modelling and explicit instruction from their teachers. Poor readers, for example, can be taught reading comprehension strategies such as keeping the purpose of an assignment in mind when reading; activating relevant background knowledge; identifying major points in attending to the outline and flow of content; monitoring understanding by generating and trying to answer questions about the content; or drawing and testing inferences by making interpretations, predictions and conclusions. Instruction should include not only demonstrations of and opportunities to apply the skill itself but also explanations of the purpose of the skill (what it does for the learner) and the occasions on which it would be used

Strategy teaching is likely to be most effective when it includes cognitive modelling: the teacher thinks out loud while modelling use of the strategy. Cognitive modelling makes overt

the otherwise covert thought processes that guide use of the strategy in a variety of contexts. It provides learners with first-person language ('self talk') that they can adapt directly when using the strategy themselves. This eliminates the need for translation that is created when instruction is presented in the impersonal third-person language of explanation or even the second-person language of coaching.

In addition to strategies used in particular domains or types of assignments, teachers can model and instruct their students in general study skills and learning strategies such as rehearsal (repeating material to remember it more effectively), elaboration (putting material into one's own words and relating it to prior knowledge), organization (outlining material to highlight its structure and remember it), comprehension monitoring (keeping track of the strategies used to construct understandings and the degree of success achieved with them, and adjusting strategies accordingly), and affect monitoring (maintaining concentration and task focus, and minimizing performance anxiety and fear of failure).

When providing feedback as students work on assignments and when leading subsequent reflection activities, teachers can ask questions or make comments that help students to monitor and reflect on their learning. Such monitoring and reflection should focus not only on the content being learned, but also on the strategies that the students are using to process the content and solve problems. This will help the students to refine their strategies and regulate their learning more systematically.

References: Meichenbaum & Biemiller (1998); Pressley & Beard El-Dinary (1993); Weinstein & Mayer (1986).

10. Co-operative learning

Students often benefit from working in pairs or small groups to construct understandings or help one another master skills.

Research findings

Research indicates that there is often much to be gained by arranging for students to collaborate in pairs or small groups as they work on activities and assignments. Co-operative learning promotes affective and social benefits such as increased student interest in and valuing of subject matter, and increases in positive attitudes and social interactions among students who differ in gender, race, ethnicity, achievement levels and other characteristics.

Co-operative learning also creates the potential for cognitive and metacognitive benefits by engaging students in discourse that requires them to make their task-related information-processing and problem-solving strategies explicit (and thus available for discussion and reflection). Students are likely to show improved achievement outcomes when they engage in certain forms of co-operative learning as an alternative to completing assignments on their own.

In the classroom

Traditional approaches to instruction feature whole-class lessons followed by independent seatwork time during which students work alone (and usually silently) on assignments. Co-operative learning approaches retain the whole-class lessons but replace part of the individual seatwork time with opportunities for students to work together in pairs or small groups on follow-up practice and application activities. Co-operative learning can be used with activities ranging from drill and practice to learning facts and concepts, discussion and problem solving. It is perhaps most valuable as a way of engaging students in meaningful learning with authentic tasks in a social setting. Students have more chances to talk in pairs or small

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groups than in whole-class activities, and shy students are more likely to feel comfortable expressing ideas in these more intimate settings.

Some forms of co-operative learning call for students to help one another achieve individual learning goals, for example by discussing how to respond to assignments, checking work, or providing feedback or tutorial assistance. Other forms of co-operative learning call for students to work together to achieve a group goal by pooling their resources and sharing the work. For example, the group might conduct an experiment, assemble a collage, or prepare a research report to be presented to the rest of the class. Co-operative learning models that call for students to work together to produce a group product often feature a division of labour among group participants (e.g. to prepare a biographical report, one group member will assume responsibility for studying the person's early life, another for the person's major accomplishments, another for the person's effects on society, and so on).

Co-operative learning methods are most likely to enhance learning outcomes if they combine group goals with individual accountability. That is, each group member will be held accountable for accomplishing the activity's learning goals (students know that any member of the group may be called on to answer any one of the group's questions or that they will all be tested individually on what they are learning).

Activities used in co-operative learning formats should be well suited to those formats. Some activities are most naturally carried out by individuals working alone, others by students working in pairs, and still others by small groups of three to six students.

Students should receive whatever instruction and scaffolding they may need to prepare them for productive engagement in co-operative learning activities. For example, teachers may need to show their students how to listen, share, integrate the ideas of others and handle disagreements constructively. During times when students are working in pairs or small groups, the teacher should circulate to monitor progress, make sure that groups are working productively and provide any assistance needed.

References: Bennett & Dunne (1992); Johnson & Johnson (1994); Slavin (1990).

11. Goal-oriented assessment

The teacher uses a variety of formal and informal assessment methods to monitor progress towards learning goals.

Research findings

A well-developed curriculum includes strong and functional assessment components. These assessment components are aligned with the curriculum's goals, and so they are integrated with its content, instructional methods and learning activities, and designed to evaluate progress towards its major intended outcomes.

Comprehensive assessment does not just document students' ability to supply acceptable answers to questions or problems; it also examines the students' reasoning and problem-solving processes. Effective teachers routinely monitor their students' progress in this fashion, using both formal tests or performance evaluations and informal assessments of students' contributions to lessons and work on assignments.

In the classroom

Effective teachers use assessment for evaluating students' progress in learning and for planning curriculum improvements, not just for generating grades. Good assessment includes data from many sources besides paper-and-pencil tests, and it addresses the full range of goals or intended outcomes (not only knowledge but also higher-order thinking skills and content-related values and dispositions). Standardized, norm-referenced tests might comprise part of the assessment programme (these tests are useful to the extent that they measure intended outcomes of the curriculum and attention is paid to students' performance on each individual item, not just total scores). However, standardized tests should ordinarily be supplemented with publisher-supplied curriculum-embedded tests (when these appear useful) and with teacher-made tests that focus on learning goals that are emphasized in instruction but not in external testing sources.

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In addition, learning activities and sources of data other than tests should be used for assessment purposes. Everyday lessons and activities provide opportunities to monitor the progress of the class as a whole and of individual students, and tests can be augmented with performance evaluations such as laboratory tasks and observation checklists, portfolios of student papers or projects, and essays or other assignments that call for higher-order thinking and application. A broad view of assessment helps to ensure that the assessment component includes authentic activities that provide students with opportunities to synthesize and reflect on what they are learning, think critically and creatively about it, and apply it in problem-solving and decision-making contexts.

In general, assessment should be treated as an ongoing and integral part of each instructional unit. Results should be scrutinized to identify learner needs, misunderstandings or misconceptions that may need attention; to suggest potential adjustment in curriculum goals, instructional materials or teaching plans; and to detect weaknesses in the assessment practices themselves.

References: Dempster (1991); Stiggins (1997); Wiggins (1993).

12. Achievement expectations

The teacher establishes and follows through on appropriate expectations for learning outcomes.

Research findings

Research indicates that effective schools feature strong academic leadership that produces consensus on goal priorities and commitment to instructional excellence, as well as positive teacher attitudes towards students and expectations regarding their abilities to master the curriculum. Teacher effects research indicates that teachers who elicit strong achievement gains accept responsibility for doing so. They believe that their students are capable of learning and that they (the teachers) are capable of and responsible for teaching them successfully. If students do not learn something the first time, they teach it again, and if the regular curriculum materials do not do the job, they find or develop others that will.

In the classroom

Teachers' expectations concerning what their students are capable of accomplishing (with teacher help) tend to shape both what teachers attempt to elicit from their students and what the students come to expect from themselves. Thus, teachers should form and project expectations that are as positive as they can be while still remaining realistic. Such expectations should represent genuine beliefs about what can be achieved and therefore should be taken seriously as goals towards which to work in instructing students.

It is helpful if teachers set goals for the class and for individuals in terms of floors (minimally acceptable standards), not ceilings. Then they can let group progress rates, rather than limits adopted arbitrarily in advance, determine how far the class can go within the time available. They can keep their expectations for individual students current by monitoring their progress closely and by stressing current performance over past history.

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At the very least, teachers should expect all their students to progress sufficiently to enable them to perform satisfactorily at the next level. This implies holding all students accountable for participating in lessons and learning activities and for turning in careful and completed work on assignments. It also implies that, in addition to the other elements of good teaching summarized in the preceding principles, struggling students will receive whatever extra time, instruction and encouragement are needed to enable them to meet expectations.

When individualizing instruction and giving students feedback, teachers should emphasize continuous progress relative to previous levels of mastery rather than how students compare with their classmates or with standardized test norms. Instead of merely evaluating relative levels of success, teachers can diagnose learning difficulties and provide feedback accordingly. If students have not understood an explanation or demonstration, teachers can follow through by re-teaching (if necessary, in a different way rather than by merely repeating the original instruction).

In general, teachers are likely to be most successful when they think in terms of stretching students' minds by stimulating them and encouraging them to achieve as much as they can, not in terms of 'protecting' them from failure or embarrassment.

References: Brophy (1998); Creemers & Scheerens (1989); Good & Brophy (2000); Shuell (1996); Teddlie & Stringfield (1993).

Conclusion

To date, most research on teaching has been conducted in the United States, Canada, Western Europe and Australia, and so the degree to which findings apply to other countries has yet to be addressed. The principles presented in this booklet are believed to apply universally, however, for two reasons. First, research done all over the world suggests that schooling is much more similar than different across countries and cultures. The day is divided into periods used for teaching each of the subjects included in the curriculum, and teaching includes whole-class lessons in which content is developed through teacher explanation and teacher/student interaction, followed by practice and application activities that students work on individually or in pairs or small groups. Second, the principles refer to generic aspects of teaching that cut across grade levels and school subjects, not to particular curriculum content. In summary, these principles ought to apply universally because they focus on basic and universal aspects of formal schooling. They still require adaptation to the local context, however, including relevant characteristics of the nation's school system and the students' cultures.

The generic principles featured in this booklet need to be supplemented with more specific principles that apply to the teaching of particular school subjects to particular types of students. Readers interested in planning instruction for particular grade levels and subject areas can consult the scholarly literature in the subject areas for elaborations on and additions to the principles outlined here.

Finally, although twelve principles are highlighted for emphasis and discussed individually, each principle should be applied in conjunction with the others. That is, the principles are meant to be understood as mutually supportive components of a coherent approach to teaching in which the teacher's plans and expectations, the classroom learning environment and management system, the curriculum content and instructional materials, and the learning activities and assessment methods are all aligned as means of helping students attain intended outcomes.

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